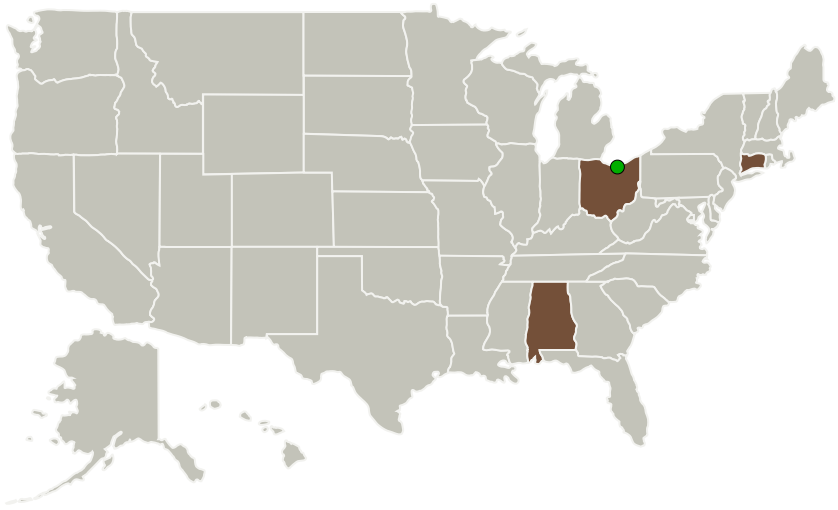
Microchannel Thermo Catalytic Ignition for Advanced Mono- and Bipropellants, Phase I

Completed Technology Project (2010 - 2011)

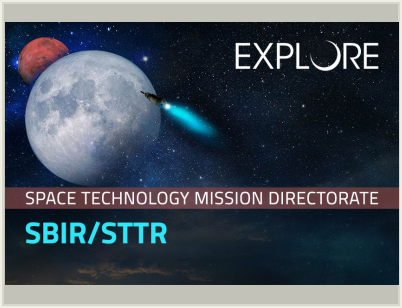
Project Introduction

Small and micro-spacecrafts require the efficient, micro-propulsion systems. Chemical micro-propulsion is best suited for use as primary thrust, orbital insertion and attitude control because of its high energy density. When grouped into arrays for larger thrust applications, micro-propulsion devices provide high propulsive flexibility or can be used as igniters. The proposed effort will focus on thermo-catalytic ignition and combustion of advanced mono- and bi-propellants in micro-channels; and the development of a micro-propulsion device. An innovative near net shape forming technique, in combination with carbon nanotube deposition, will facilitate manufacturing of sub-millimeter diameter micro-channels and tubes with enhanced internal surfaces area for maximum catalytic reaction. The microchannels will provide thermo-catalytic ignition of bi-propellant rockets without needing high voltage igniters and can also provide stable and reliable ignition source for advanced, environmentally friendly, mono-propellants.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio
University of Connecticut	Supporting Organization	Academia	Storrs, Connecticut



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations	
Alabama	Connecticut
Ohio	

Project Transitions

January 2010: Project Start

January 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139216)*

Project Management

Program Director:

Jason L Kessler

Program Manager:

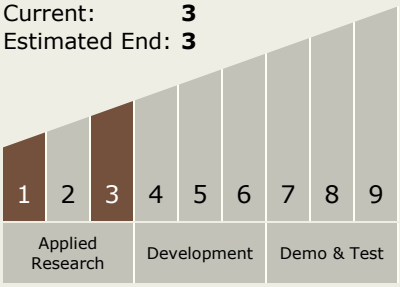
Carlos Torrez

Principal Investigator:

Anatoliy Shchetkovskiy

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.6 Gels

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System